

RESEARCH OF PROPERTIES OF POLYAMIDE PRODUCTS WITH REDUCED WATER

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In mechanical engineering, polyamides are most commonly used as structural material and can be reinforced with the following components: fiberglass, talc, graphite, oil, molybdenum disulfide.

The main part of the polyamides are partially crystalline thermoplastic polymers, which are characterized by high strength, rigidity and toughness, as well as resistance to the environment.

Most of the properties are due to the presence of amide groups, which are linked by hydrogen bonds. A number of properties of polyamides depend on their crystalline construction, in particular on the water content.

Polyamides interact with the environment by reversibly absorbing moisture, with water collecting in amorphous regions of the polyamide. Moisture absorption of polyamides directly affects their durability.

Machine-building products were offered to be made from PA-12 and studies of its properties under conditions of product exploitation were carried out. PA-12 has high abrasion resistance, deformation heat resistance and stability of electrical parameters in a wide temperature-humidity interval. In PA-12, water absorption does not exceed 1.0 %, which allows to keep operational performance in a humid atmosphere. In the process of processing by injection molding at a temperature up to 280 °C decomposition of PA in the material cylinder and the release of harmful substances is not observed.

It was also suggested to use a new design of the injection molding machine nozzle, since the flow of the molten thermoplastic onto the heaters is completely eliminated, thereby increasing the life of the heaters and reducing the idle time when repairing the injection molding machine.

Polyamide grade PA-12 is characterized by high indicators of wear resistance, ductility and sliding, has the lowest true density among industrial engineering plastics, has high mechanical and deformation strength and is able to withstand high dynamic and alternating loads. Polyamide 12 and compositions based on it have little water absorption, therefore, its mechanical and thermal characteristics are somewhat reduced under certain conditions, and it is advisable to use polymer material and composites based on it in a humid environment. At the same time, the products as a whole do not lose their geometric shape and complex deformation-strength, technological operational properties. PA-12 polyamide and composites based on it retain their structure and performance in the field of high operating temperatures. They are characterized by increased resistance to organic media (oils, oil, fats, gasoline, etc.).

The table shows the most famous industrial manufacturers of polyamide grade PA-12.

Table. After the studies of the properties of the products suggest the manufacture of them from PA-12

Large global industrial manufacturers of polyamide grade PA-12 Firm	State, corporation
Evinok	Germany
Degussa AG	USA
Elmika	Russia
Gamma Plast	Russiatechnology
Roechling	Germany
Quadrant	Belgium
ENSINGER	Germany